81st Medical Group
Keesler AFB, Mississippi

Exempt (Human) Research Protocol

This is a Progress Report ____ / Final Report _XX___

1. Protocol Number: FKE20080002E

2. Title: "3D Virtual Images and Forensic Identification Training"

3. Principal Investigator (PI): Stephanie A. Stouder, Lt Col, USAF, DC, 81 DS/SGD, Phone: 376-5127, Email: stephanie.stouder@keesler.af.mil

4. Purpose:
The Readiness Skills Verification (RSV) checklist for AFSC 47XX identifies the requirement for initial and annual training in forensic identification for all AF Dentists. Currently, to ensure that dentists are properly trained for these duties, as a minimum all Air Force Dental Residency programs (13 sites) require a course in forensic dentistry including forensic identification. Annual forensic identification refresher training is also required for all dentists as part of their readiness preparation. Currently, there are 1,000 dentists and 3,000 dental technicians in the Air Force Dental Corps plus reserve dental officers and technicians. All of these are potential users of the Forensic ID ADL courseware being developed.

5. Status of the Study. Mark the status of the study (a-e).

a. _____ Active with ongoing data collection. Request approval to remain open.

b. _____ Active with data collection complete. Request approval to remain open.

c. _____ Study was never initiated and request termination of the study.

d. __XX__ Completed. Request approval to close.

e. _____ Inactive, protocol never initiated, but want to keep in open. Request approval to remain open.

6. Summary of Progress: This report covers the following period of time: October 2007 – July 2010

a. Since last progress report or initiation of study: *(Summarize progress toward achieving the objectives of the study quantify how much data collection has been achieved and/or analysis accomplished.)*

The creation of the interactive virtual laboratory has made good progress. Initially, the capture of CT images and the creation of videos from these images were significantly delayed by mission requirements of the Office of the Armed Forces Medical Examiner (OAFME). The final CT images were captured this spring and soon thereafter the development of the scenarios and the scripting of process interactivity began to come to life.

An alluring feature of this program is the ability of the student to accomplish a virtual examination of the dental records and/or the recovered body and complete an online version of the AFIP Antemortem and Postmortem forms. The completed forms will then be verified for accuracy by the software. Student errors on the forms will be noted and discussed. The correct Antemortem and Postmortem forms are presented to continue the exercise.

A key element of the student interactivity is ability of the student to query various virtual role players in the incident investigation. The student will be able to question the lab proctor, medical examiner, dental team leader, family dentist, and a forensic attorney regarding critical evidence for each missing person and each body recovered. The mix of scenarios, missing persons, obstacles, bodies recovered, events, queries, and briefings from numerous government agencies will provide well over 100,000 potential mixes, virtually precluding any two students from ever having the same mix.

Report Documentation Page

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1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
04 AUG 2010	**Final Report**	**00-10-2007 to 00-07-2010**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
3D Virtual Images and Forensic Identification Training	**FA7014-08-C-0025**
	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)	5d. PROJECT NUMBER
Stephanie Strouder	**FKE20080002E**
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
81st Medical Group,301 Fisher St,Keesler AFB,MS,39534	**FKE20080002E**

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
United States Air Force Surgeon General, Directorate of Medical Modernization, M, 5201 Leesburg Pike, Suite 1501, Falls Church, VA, 22041	**AF/SGRZ**
	11. SPONSOR/MONITOR'S REPORT NUMBER(S) **FA7014-08-C-0025**

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
The Readiness Skills Verification (RSV) checklist for AFSC 47XX identifies the requirement for initial and annual training in forensic identification for all AF Dentists. Currently, there are 1,000 dentists and 3,000 dental technicians in the Air Force Dental Corps plus reserve dental officers and technicians. All of these are potential users of the Forensic lD ADL courseware being developed. An alluring feature of this program is the ability ofthe student to accomplish a virtual examination ofthe dental records andlor the recovered body and complete an online version ofthe AFIP Antemortem and Postmortem forms.

15. SUBJECT TERMS
Forensic Identification Training; 3D Virtual dental imaging

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**1**	**3**	

This enormous mix of challenges demands a tedious and massively redundant editing process. Fortunately, this was anticipated and progress is moving ahead quite smoothly. Completion of the initial design is anticipated before the end of the year.

b. For the entire study: I have completed 100% of the study. The didactic portion of the project is complete. Creation of the interactive laboratory with 3-D imaging is in the final stage of testing.

c. If this is a FINAL REPORT: Were the protocol objectives met and how will the outcome benefit the DoD/USAF? 2. Protocol Outcomes Summary:

1. The CT images captured from the seven anatomical heads were of high quality, and they revealed an abundance of detail useful for the comparison with other cranial-facial specimens. Unfortunately, we were unable to adequately remove or obscure the scattering artifact caused by metallic dental restorations, and we were unable to successfully differentiate the software's display of non-metallic restorations from tooth structure, namely dentin or enamel. With patience, a skillful operator of the software could manipulate the images and achieve usable results. But the use of this technology to make a strictly dental comparison must wait for the development of a more user friendly functionality.

2. While our research in utilizing CT derived 3-D images to facilitate training for postmortem dental examination did not prove fruitful, it did serendipitously reveal a previously unapplied asset of these images. Our literature review indicates that measurements between specific oral-facial and cranial bony landmarks found on CT images can be quickly and accurately determined and then compared with measurements from other existing radiographic images. It is strikingly apparent that "dental" CT imaging of postmortem remains can provide a highly accurate and rapid positive body identification. This would be particularly advantageous in a contaminated environment or an enormous mass casualty venue. Realizing that dental CT cone beam technology is rapidly becoming commonplace in dental offices, particularly in the military, we recommend that the AFMS capitalize on this discovery by pursuing applied research into this technology without delay.

3. Succinctly stated, the objectives of the study were not successfully achieved, but the research nevertheless did reveal great potential for using "dental" CT derived images for positive body identification.

4. This research was part of the development of an interactive on-line educational program in forensic dental identification. This program was successfully developed and is currently in the final stage of testing before final acceptance by the Air Force for deployment.

◄ IF THIS IS A FINAL REPORT PROCEED TO # 9 ►

7. Protocol Changes: N/A

a. _____ No changes are anticipated and the project will continue as previously approved by the IRB.

b. _____ Changes are anticipated as described below:

c. When do you anticipate PCSing or separating?

8. Protocol Personnel Changes: N/A

Has there been any Principal or Associate Investigator (PI/AI) changes since approval of protocol or the last continuation review? ____ Yes ____ No. If yes, complete the following sections (Additions/Deletions). For PI/AI changes, indicate whether or not the IRB approved this change.

a. Additions:
b. Deletions:

9. Status of Approved Funding: *(Complete as appropriate; some of this information is contained in your protocol and or amendments – suggest you cut and paste info.)*

a. No funding from the Surgeon General Office (SGO) was requested in my original protocol.

b. Request funding in the amount of $ - 0 - for FY10.

c. I have received External Resources to support this study in the form of: *(Describe all those applicable: loaned equipment, consumable supplies, drugs from a non-DoD source, and/or funds from an external source, in this case give the name and amount)* Development of the course software is being accomplished under AF/SGR FY06/07 contracts with Mountain Top Technology, Johnstown, PA, using Congressional Special Interest funding. 81MDG provided funding ($11,200) for use of cadaver specimens obtained from the University of South Alabama. AF/SGR provided Congressional Special Interest funding ($27,200) to the Armed Forces Institute of Pathology (AFIP) to reimburse for labor and travel of one of the Collaborative Investigators (Mr. Getz) and for wear and tear on the CT scanners. Travel for the Principal Investigator to various meetings in support of the project has been supported by AF/SGR from Congressional funds.

10. Publications/Presentations/Awards: N/A
(List OR attach any scientific publications, presentations, and/or awards that have resulted from this protocol. Include pending/scheduled publications, presentations, or awards. Also include date of submission/acceptance, location and date of presentation, location and date of award.)

11. Certification of Principal Investigator

My signature certifies that the above titled research has been conducted in full compliance with the HHS/FDA Regulations and IRB requirements/policies governing human subject research. I understand that a Progress Report is required in order to maintain continuation approval and any changes in the study/methodology must be approved by the IRB prior to implementation. If the study has never been initiated and I am requesting termination (Item 5.c. above), my signature certifies this request. If the study is completed (Items 5.d. & 6.c. above) and I am requesting closure, my signature certifies that the information provided on this form represents an accurate final report.

Stephanie Stouder
Signature of Principal Investigator

4 Aug 10
Date

STEPHANIE STOUDER, Lt Col, USAF, DC
81 DS/SGD